



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
NORTHERN PRAIRIE WILDLIFE RESEARCH CENTER  
JAMESTOWN, NORTH DAKOTA 58401

E7.5-101.9.2

CA 142341

REMS 10.30.4

April 4, 1975

"Made available under NASA sponsorship  
in the interest of early and wide dis-  
semination of Earth Resources Survey  
Program information and without liability  
for any use made thereof."

NASA Lyndon B. Johnson Space Center  
Principal Investigator Management Office  
Attn: R. E. Joosten, Mail Code TF6  
Houston, Texas 77058  
Mark for: T-4114B

SUBJECT: Progress Report and Financial Statement - Utilization of  
Skylab (EREP) System for Appraising Changes in Continental  
Migratory Bird Habitat (Investigation Number 486)

Dear Mr. Joosten:

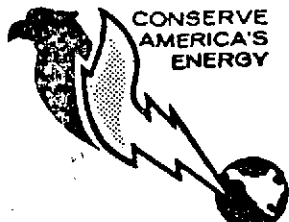
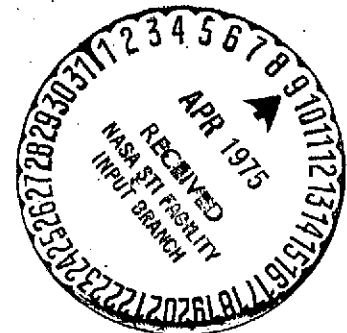
The enclosed progress report and financial statement are submitted  
for the month of March 1975.

Sincerely yours

David S. Gilmer  
Principal Investigator

Enclosures

cc: P.I. Management Office (2)  
Earth Resources Program Office (2)  
Scientific & Tech. Info. Facility (1)  
Remote Sensing Coordinator, USFWS (1)  
E.A. Work, ERIM (1)  
L. Barrineau, FWS Contracting Office (1)



Save Energy and You Serve America!

N75-20795  
Unclas  
CSCL 08H G3/43 00192  
(E75-10192) UTILIZATION OF SKYLAB (EREP)  
SYSTEM FOR APPRAISING CHANGES IN CONTINENTAL  
MIGRATORY BIRD HABITAT Monthly Progress  
Report, Mar. 1975 (Northern Prairie Wildlife  
Research Center) 7 p HC \$3.25

Investigation Title: Utilization of Skylab (EREP) System  
for Appraising Changes in Continental  
Migratory Bird Habitat.

EREP Investigation No. 486

Period Covered: March 1975

NASA Contract No. T-4114B

USDI Contract No. 14-16-0008-802

Principal Investigations Management Office:

Lyndon B. Johnson Space Center  
Houston, Texas 77058

Technical Monitor Name: Mr. R. E. Joosten

Principal Investigator and sponsoring institution name:

Dr. David S. Gilmer  
Northern Prairie Wildlife Research Center  
U.S. Fish and Wildlife Service  
Jamestown, North Dakota 58401

Type of Report: Monthly Progress

Overall Status:

A major task of this program includes the mapping of surface water features by thresholding radiance data values in a single near-infrared channel. The S-192 sensor has five bands in the wavelength range 0.77 to 1.73  $\mu\text{m}$ , any of which is potentially useful for carrying out water discrimination by the thresholding technique. Skylab S-192 data offers the opportunity for appraising the relative usefulness of each of these several near-infrared channels. Such an evaluation has been conducted, the results of which are presented in Figures 1 through 4. In the wavebands considered in Figures 1 through 3, bare soil is the terrain feature most likely to be mistaken for open surface water. Each histogram represents an accumulation of about 350 points (pixels) drawn from throughout the data file. Overlap of water and bare soil histogram tails generally decreases with increasing wavelength. In the 1.55 to 1.73  $\mu\text{m}$  waveband the terrain material most likely to be mistaken for open water is described as "lush, new growth vegetation" (Fig. 4); but there is no overlap of histograms in this waveband. Our conclusion based upon these data is that the 1.55 to 1.73  $\mu\text{m}$  S-192 channel is the least ambiguous for water discrimination using the thresholding method. This would confirm earlier work which utilized low altitude aircraft multispectral scanner data. Also, data at wave-

lengths greater than 2.0  $\mu\text{m}$  were not considered because our earlier work had indicated that sufficient solar irradiance is not present at these longer wavelengths.

Water recognition maps are being generated using 1.55 to 1.73  $\mu\text{m}$  data. A collation of statistical data on surface water features is also to be produced. Maps and statistics will be compared with ERTS data collected approximately one month before and one month after the occurrence of the EREP data observation. In preparing for this comparison it has become evident that the S-192 pixel size is not equivalent to the sensor's instantaneous-field-of-view (79 meters square). We have empirically discovered that a pixel for line straightened data is approximately 69 meters square. In order to determine pixel size more accurately, both cross track and along track distances will be measured on a recognition map and these distances compared with existing accurately scaled maps. Such a determination is necessary if meaningful comparisons with ERTS derived pond and lake area tabulations are to be made.

#### Recommendations for Action:

The problems of multispectral data processing caused by the occurrence of random spatial misregistration of line straightened S-192 data are still being considered. Our current thinking is that it would be useful to perform multispectral processing using unstraightened or circular scan data; however, this possibility will be further discussed with the NASA/JSC technical monitor in a separate communication.

#### Expected Accomplishments During the Next Reporting Period:

Surface water thematic maps and associated statistics will be generated from S-192 data. Comparisons of S-192 data will be made with ERTS-1 data collected about the same time period. Multispectral processing of selected data will begin.

#### Significant Results:

None to report.

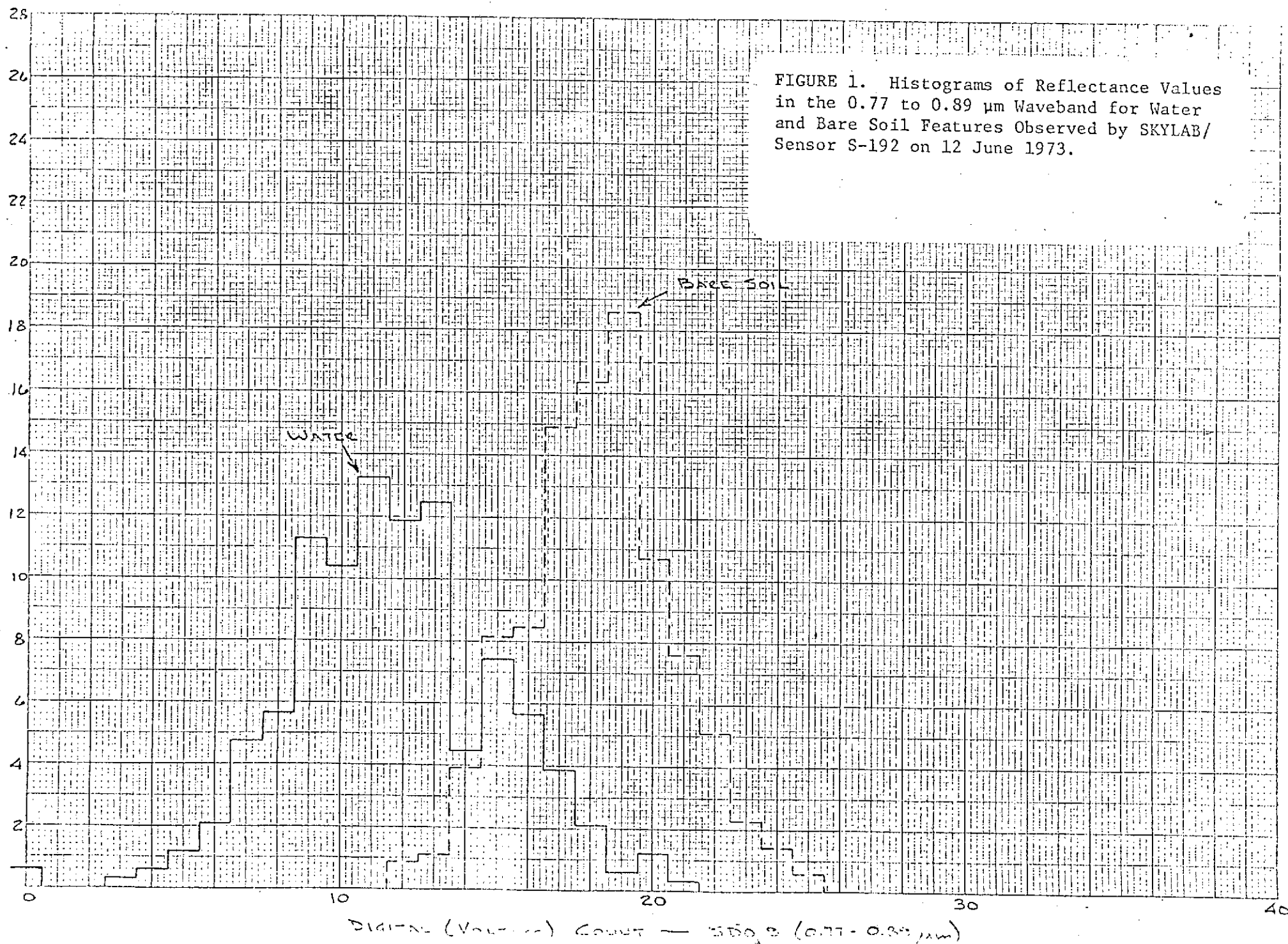
#### Summary Outlook:

We are now in the major processing and analysis effort of this program. Mapping of open surface water using a single channel, near-infrared discrimination technique is being accomplished. Subsequent work will involve multispectral data analysis.

#### Travel Summary and Outlook:

No travel was undertaken during this reporting period. Travel is not anticipated during the next reporting period.

FIGURE 1. Histograms of Reflectance Values in the 0.77 to 0.89  $\mu$ m Waveband for Water and Bare Soil Features Observed by SKYLAB/Sensor S-192 on 12 June 1973.



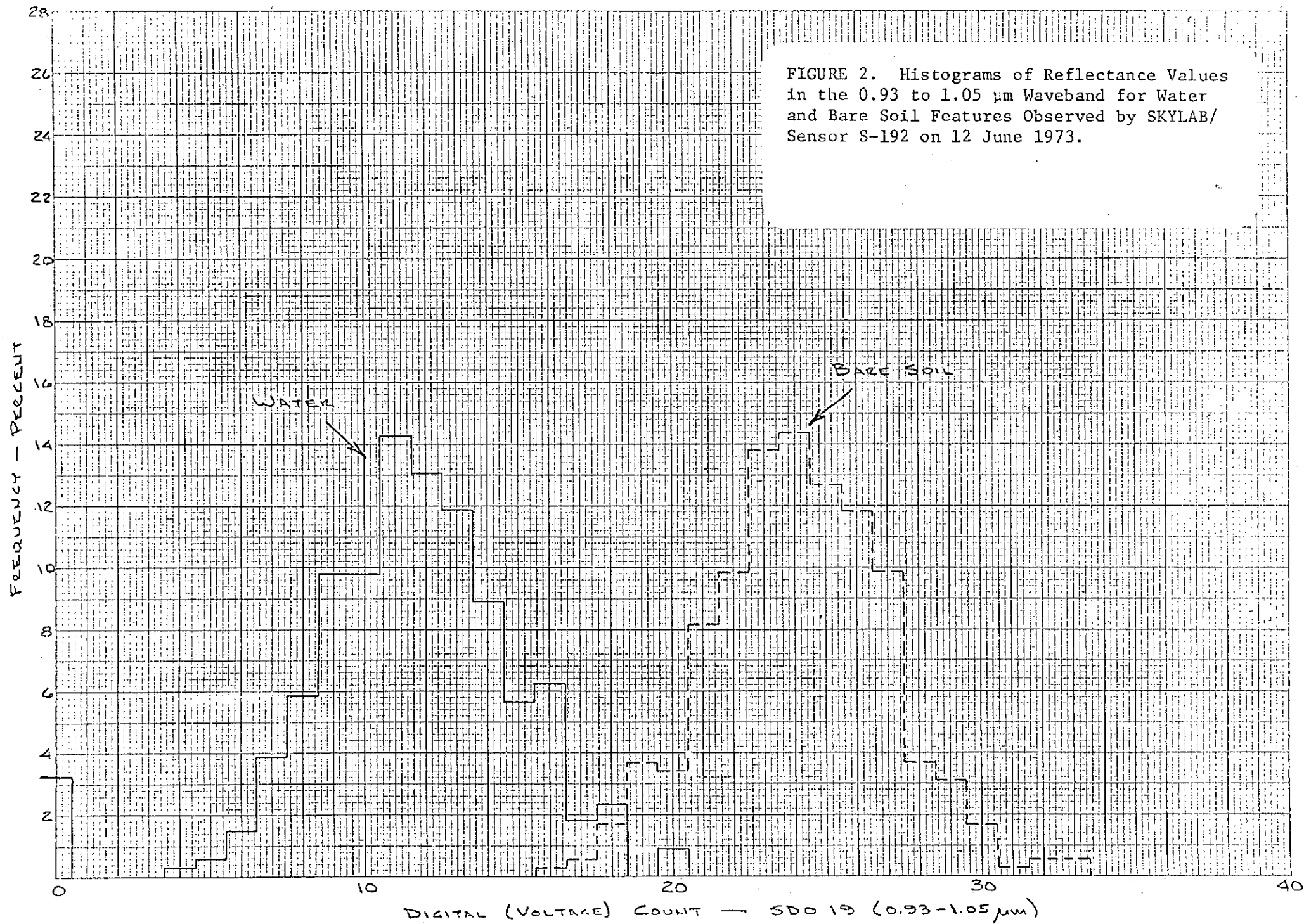


FIGURE 3. Histograms of Reflectance Values in the 1.15 to 1.28  $\mu$ m Waveband for Water and Bare Soil Features Observed by SKYLAB/Sensor S-192 on 12 June 1973.

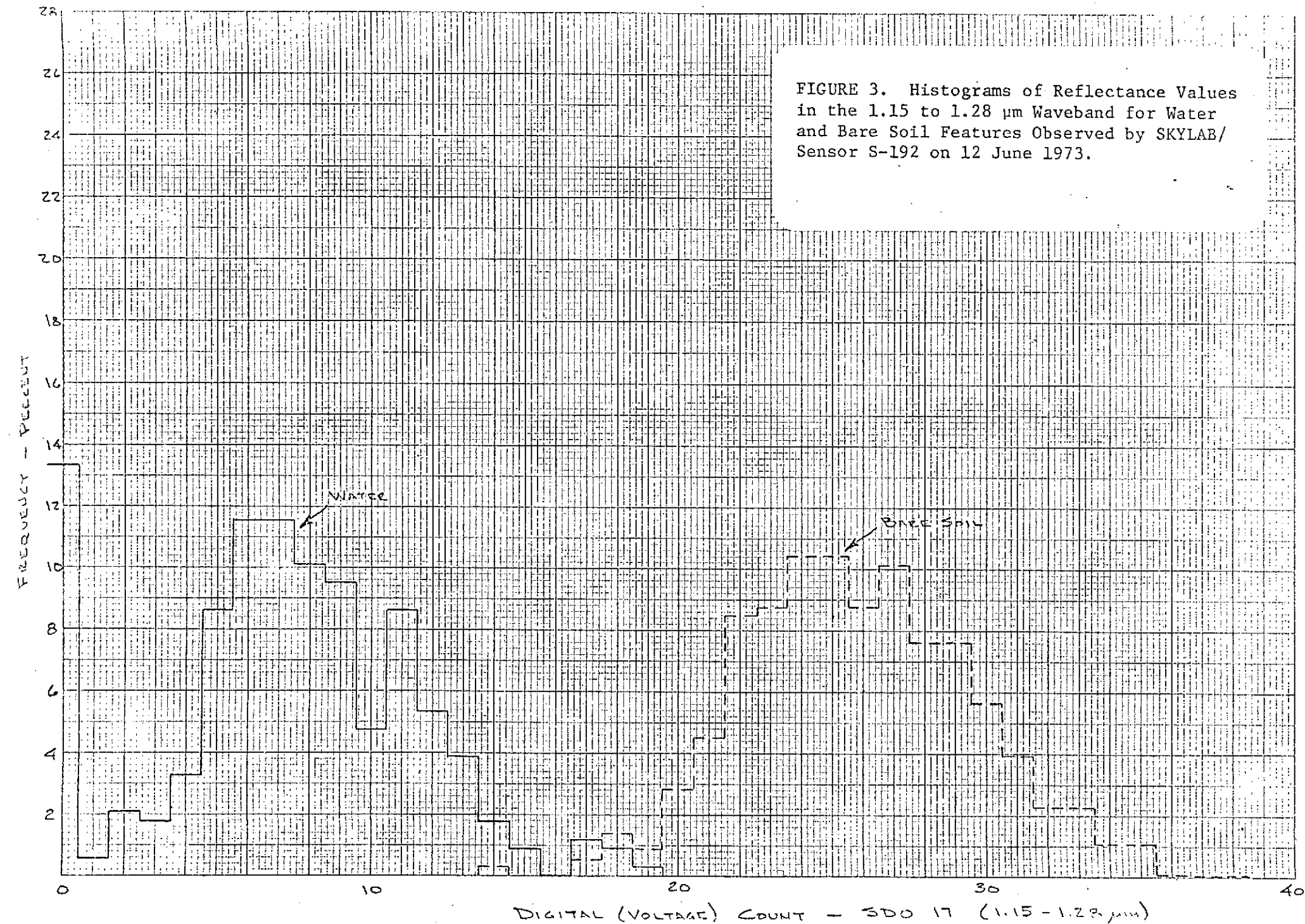


FIGURE 4. Histograms of Reflectance Values  
in the 1.55 to 1.73  $\mu$ m Waveband for Water  
and Lush New Growth Vegetation Features  
Observed by SKYLAB/Sensor S-192 on  
12 June 1973.

